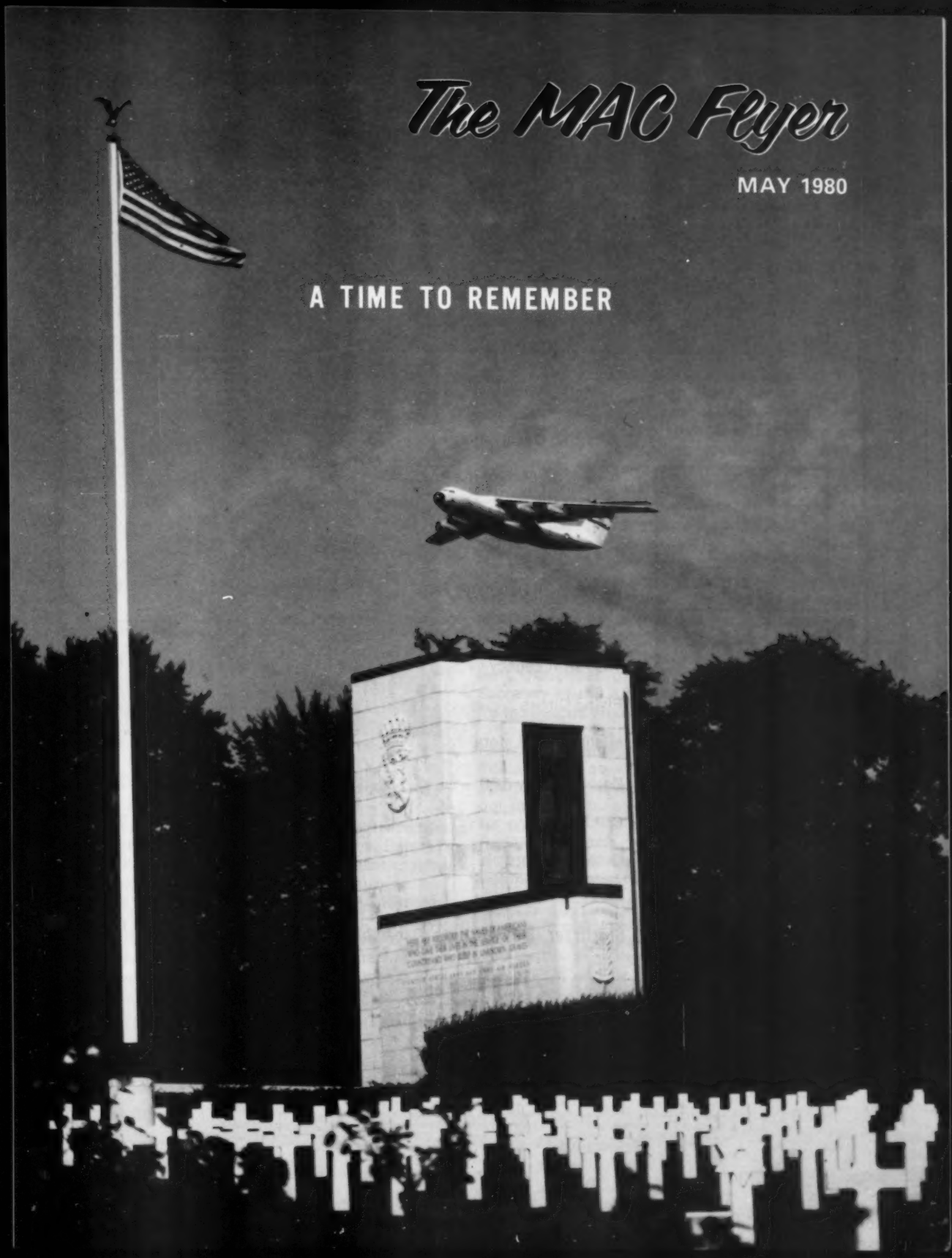
The MAC Flyer

MAY 1980



The MAC Flyer

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For Greater Safety and Efficiency
in MAC Air Operations.

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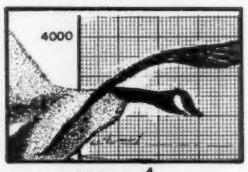

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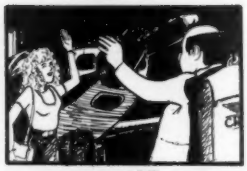

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Cover: *Starlifter in flight over Luxembourg cemetery.*

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A Parting Observation

Colonel Ruel J. Neeley
Director of Safety

As it does for all of us sooner or later, the time has rolled around for me to be moving on. Before I clean out my desk and head out the gate though, I'd like to share a thought or two with you.

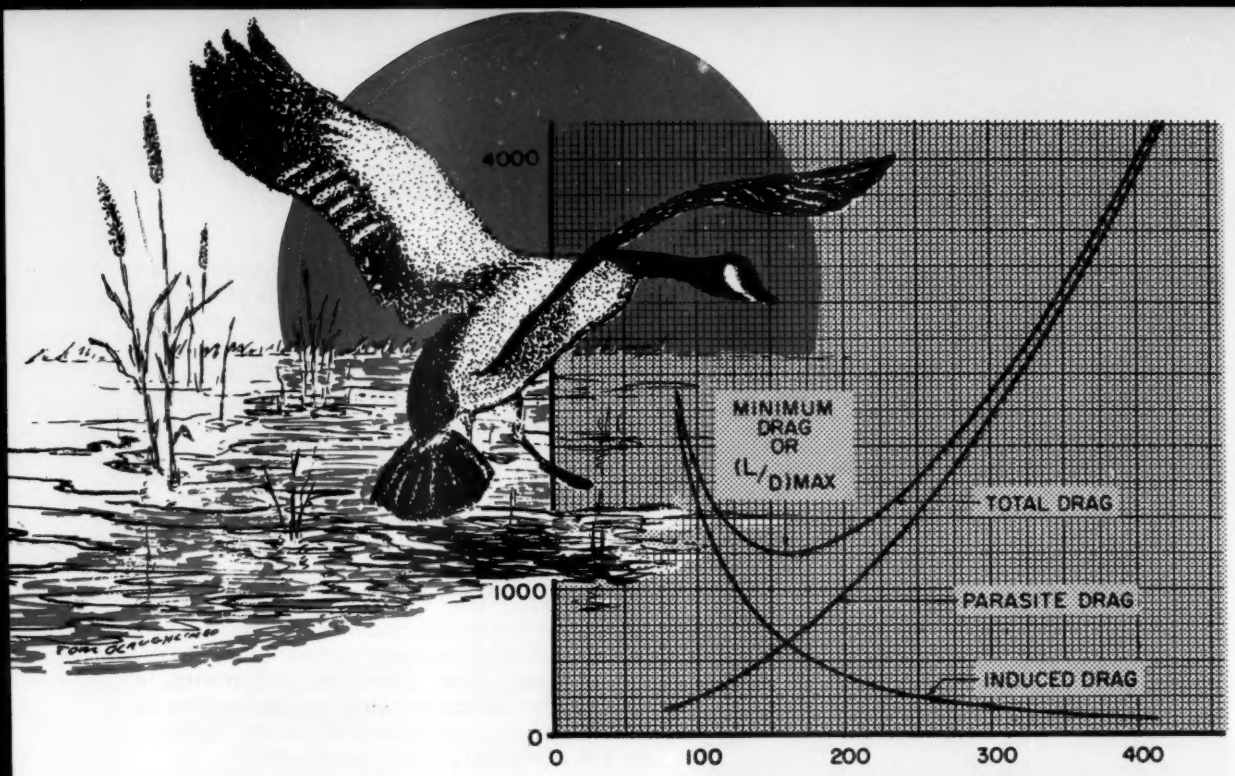
During my two and a half years as MAC Director of Safety, I've seen an interesting combination of both interesting and encouraging events take place. Not long after I was firmly entrenched in this job, the command was named winner of the Secretary of the Air Force Safety Award for 1977.

From that pinnacle of safety achievement, which was gained in a large measure on the strength of the best yearly flying safety record the command had ever achieved, we have built a solid foundation for our safety programs. CINCMAC, Vice CINC, and the Inspector General have provided the leadership, guidance and support for the best safety program the Air Force has ever witnessed. Commanders, functional managers and supervisors have assured a successful program by assigning highly qualified personnel to safety staff positions and I am convinced our outstanding safety record is a direct reflection of their efforts. The various channels of communication to aircrews, maintenance and support personnel through accident summaries, briefings, and *The MAC Flyer* were also instrumental in reducing the number of flying related fatalities, as well as the loss of equipment which is essential to our way of life and our wartime mission.

For the past two years I have visited the major units in MAC and have witnessed the amazing reservoir of spirit and dedication that permeates the "working level." This spirit, along with the *overall* excellence of the command's safety efforts were recognized officially with the award of the Secretary of the Air Force Safety Trophy to MAC for the second time in a three-year period.

So, as I close out this challenging and rewarding chapter in my life, and finish up my Air Force career as well, I do so on an extremely optimistic and pleasant note. My best wishes go out to all of you as you continue traveling to the far corners of the globe, carrying on the proud tradition of safe, responsive and dependable airlift, rescue, aeromedical evacuation and weather recon that has become MAC's hallmark.

Colonel Neeley is hanging up his blue suit after 28 years in the Air Force. He plans to exchange his Nomex flying togs for the more dapper apparel of a DC-9 pilot when he joins a small but ambitious new midwestern airline. We wish him many safe and happy landings in his new career. —Ed.



The transition between soaring flight and the return to an earth-bound existence combines elements of artistry and aerodynamics for both bird and man.

Art and Science of the Approach

According to Flight Safety Foundation statistics, the approach-and-landing phase of a mission consumes only four percent of the flying time; however, it accounts for fifty percent of the aircraft accidents. MAC's experience over the last couple of years seems to bear witness to the accuracy of the Foundation's figures. This article by Captain Neil Williams, a civilian test pilot, is presented to stimulate thought about the dynamics of flying safe approaches and landings. Originally printed in Shell Aviation News, *it is adapted from Eastern Airline's* Flight Line.—*Ed.*

A wild goose came out of the north with the wind sighing through his pinions, and he circled the pond assessing its length. It was a bit on the small side, but there was no other pond close by, and darkness was approaching.

The boy, breathless with excitement, froze and hoped that the majestic bird would not fly on. Wings outstretched, the goose glided the length of the pool, his head turning, his bright eyes missing nothing. He flew a wide circle, coming in low, with his tail spread, and wings held high and arched in a curve. His leading edge feathers flicked up occasionally, demonstrating his mastery over the narrow margin between exquisite flight and loss of control. Lower he came, head held forward, attention peaked. Instinct told him that he was too big and heavy to be careless at such a low speed. His trailing feet helped him with directional control and as he started to flare, they came quickly forward to act as shock absorbers and landing skis.

With hereditary knowledge, the bird alighted on the water in a cloud of cold spray, aware that he must not waste valuable distance in a smooth and pretty landing. Twisting his wings upward for maximum braking,

No human pilot could emulate the skill and precision I saw that evening.

he surged to a stop in a shower of flying droplets. He turned, as if to assess his landing run, and after carefully folding his wings, jiggled his tail feathers in apparent satisfaction and swam off into the rushes.

It was an experience of a lifetime, and I still remember the rapt attention with which I watched that superb demonstration of control. No human pilot could emulate the skill and precision I saw that evening. If they could, I suspect there would rarely be a landing accident. What the goose knows by instinct, however, we humans must learn by practice and experience, though we always remain amateurs by comparison.

Final Approach

Even so, we *have* learned quite a bit about the art of flying and augmented it with scientific study. Consider the goose's sacrifice of a smooth touchdown in favor of accuracy, as compared to our techniques for short-field and wet-runway landings in various transport aircraft. When we wish to reduce touchdown speed we often make the approach with all high-lift and drag devices extended and the aircraft literally aimed at the landing zone. There is little or no flare and the firm touchdown is intended to kill speed and help break through water that causes hydroplaning.

This type of final approach is flown at a nearly constant angle of attack (AOA) after approach configuration and airpseed are established, and it is probably the most consistently accurate method of bringing an airplane safely to touchdown yet devised. With the help of sophisticated landing systems, the constant-AOA approach is also used to land planes aboard aircraft carriers. Unfortunately it cannot be applied exactly to all transport operations for several reasons. First, such landings are unmistakably rough. Also, most present-day jetliners, when operated at such low speeds, would be dangerously close to a stall throughout the approach. With the high drag, high angle of attack, and high thrust required to maintain flight, there would be little margin for error or mechanical failure. Consequently most jet transports fly final approach at a more comfortable speed—approximately 1.3 times stall velocity (1.3 V_S). When approach speeds are reduced for short-field or wet-runway operations, they get closer to stall speed and border on the classic example of the old instructor's quip: "To go up, pull back on the stick; to come down, pull the stick back further."

Considering final approach techniques brings up the yet unresolved argument about theories of aircraft control on final. The first school of thought contends that you use power to control the rate of descent, and therefore glide path, and elevator to control airspeed. On the other side, some say that power controls airspeed, and elevator governs pitch and therefore glide path. Indeed, it's often considered that the first point of view is a piston-engine technique, and that jet operations require the latter. It is perhaps worthwhile remembering that this idea initially evolved because older turbojets accelerated slowly and early jet aircraft, like the Canberra (B-57), were very clean even in the landing configuration. So, speed changed more slowly in response to elevator inputs, as compared with the alteration that could be made to rates of descent on the glide path. It seems the answer to this problem depends on how much excess thrust the aircraft has. In practice, most pilots blend their pitch and power adjustments together. We find today that to stay on glide path using a flight director computer's command information you normally adjust pitch, while power controls airspeed. This will work well as long as approach speed is on the order of 1.4V_S and the aircraft is therefore operating on the front side of the drag curve. If the speed goes "around the corner" and thrust required closely approximates thrust available, then full power could be required to hold a normal flight path at a high AOA.

The pilot judges the plane's approach in visual conditions according to what the picture out the windscreen looks like. However, after a long period at high altitude, he needs time to readjust his depth perception, so it's best to use all available approach aids even in VMC. ILS, PAR and VASI can help assure that you are following the proper glide path and not falling prey to any of the numerous visual illusions.

Adding all the variables together from final approach to touchdown, we have a problem worthy of the most advanced computer.

Threshold Accuracy

It's often said that a good approach means a good landing. While this may not always be true, it is fairly certain that a poor approach will generally result in an *interesting* landing.

When a jet airplane is certificated, the landing tests require that it be flown to 50 feet AGL along a glideslope determined by the manufacturer, after which all throttles are closed and the aircraft is landed and stopped as quickly as possible. The minimum speed at the 50-foot point is 1.3V_S and the resulting landing distance is used to compute required field lengths. The manufacturer has to demonstrate a spread of speeds either side of the ideal throttle closure point, usually minus five to plus 15 knots, to allow for errors in pilotage and extra speed used for special conditions like gusty crosswinds. It follows that if the speed at the threshold is above this 15-knot margin, and landing distance is at all important, then a go-around must be started. Otherwise, the usual result is a long, fast touchdown, often followed by lamentations and recriminations.

Lofty pressure altitudes and high temperatures also have a marked effect on actual speed over the threshold. For example, when landing at Nairobi, which is more than 5,000 feet above sea level, your TAS on final approach is appreciably higher than indicated speed. As a result, most aircraft seem to naturally approach on a shallower glide path if the pilot is retaining sufficient rpm to insure rapid jet engine response. In this case, it is more important than ever to achieve the correct threshold speed, because a small increase in IAS means a lot of ground speed increase and subsequently more energy for the brakes to dissipate. As a rule of thumb, five knots extra speed over the threshold means a ten percent increase in landing roll.

The Flare

As mentioned before, the easiest approach to fly is the steady-angle-of-attack no-flare variety used in carrier operations. As we depart that basic method for a smoother touchdown, it's necessary to consider the landing flare in some detail. The first step is to reduce speed steadily while holding a straight approach path, thus requiring a slow increase in angle of attack to hold the runway in constant perspective. As the pitch angle changes, the pilot must look further down the runway to judge attitude and alignment. Upon reaching the estimated landing attitude—usually learned through trial and error—and with the throttles at idle, everything is held constant 'till ground contact. In addition to the mechanical actions of manipulating controls and throttles, if the flyer also correctly estimates the effects of crosswinds, gusts, inertia and windshear, then we have a smooth placement of the aircraft tires on the landing surface.

Touchdown technique is extremely important, because a great deal of distance can be wasted in floating the aircraft just above the runway, instead of getting it on the ground and using spoilers, reverse thrust and wheel brakes to slow it to a stop. On a wet runway, tires can be badly scalded by a silky smooth touchdown that sets up hydroplaning.

Adding all the variables together from final approach through touchdown, we have a problem worthy of the most advanced computer. Fortunately such a computer, the human brain, is at our disposal. It has a good learning curve based on experience and powerful memory banks. Given sufficient mechanical and visual cues, and good training and practice, the human "computer" system can bring a half-million pound airplane back to earth with an incredibly light touch.

So why do we feel admiration when we see a goose slanting in to land on a sheet of glassy water with the setting sun highlighting its outstretched wings? Perhaps because the bird represents the facts of science and the art of nature blended perfectly in the miracle of flight.

The Ultimate Fuel Crisis

Flying a plane until the fuel tanks run dry and then crashing because the engines quit is about in the same class as touching down with the gear up. It's one of those things that pilots swear can never happen to them, and yet it *does* happen. Here are three deadly examples, two of which involved well known *"personalities."*

• Case number one. A DC-8 with 181 passengers and a crew of eight on board crashed near Portland International while attempting to land, killing ten people. According to the NTSB report, the probable cause of the accident was failure of the captain to monitor fuel status or to heed warnings from his crewmembers about low fuel levels. It seems he was preoccupied with a landing gear malfunction and spent nearly a half-hour flying around in a holding pattern trouble-shooting before requesting expert guidance from airline maintenance staffers on the ground. Almost an hour elapsed between the time the problem was initially reported and the flameout on final occurred. Contributing to the situation, said the Board, was the failure of the first officer and flight engineer to communicate to the captain the criticality of the fuel status until the accident was inevitable.

• Case number two features Francis Gary Powers, a pilot with more than 7,000 flying hours who may be remembered for a rather spectacular U-2 flight over Russia in the '50s. Powers crashed his Bell 206B "telecopter" during an autorotation attempt after it ran out of fuel while he and a cameraman were covering a brush fire for a Los Angeles TV station. The Safety Board cited Powers for "mismanagement of fuel" and "fuel exhaustion"—the conditions which forced his unsuccessful and fatal autorotation attempt. "There are few temptations in flying," said the Board, "which are more difficult to resist than the urge to keep going despite worsening weather or diminished fuel supply. And there are few mistakes as deadly."

• Case number three. The crash of a chartered twin-engine Convair 240 resulted in the death of four members of the Lynyrd Skynyrd rock music group and two of the plane's crewmembers. Investigators concluded that the crew had been operating the right engine in an "auto-rich" fuel mixture which increased consumption considerably above normal. According to a pilot on board who survived the crash, the crew was trying to compensate for a "rough" operating condition in the engine. They were cited by the Board for being either "negligent or ignorant of the increased fuel consumption because they failed to monitor adequately the engine instruments for fuel flow and fuel quantity." Result? The Convair, its fuel exhausted, lost both engines and crashed in a wooded area near Gillsburg, Mississippi.

Similarities in crew member attitudes and performance in these three incidents are remarkable—in each case they took their fuel supply for granted until it was too late. Could such a thing happen to us? Of course not . . . but then they probably didn't think it could happen to them either.

The Cave of Change One to the MACSUP

by Lt Shannon T. Kingsley
Det 5, 40 ARRS
Edwards AFB, California

In my office work I was behind,
and the paper pile boggled my mind.
I began writing reports and letters,
trying to break the paperwork fetters.

Typing and writing caused me to tire,
so I took a break and read *The MAC Flyer.*
In this task I was gainfully employed,
when from my Air Force desk I was deployed.

I found myself in woods damp and dark,
a place full of branches, bushes, and bark.
Yet even in these scary woods I stayed cool,
thanks to my training at survival school.

To keep up my strength I needed a snack,
and my ears detected a nearby quack.
At first, I couldn't believe my good luck,
but right there before me was a fat, sitting duck.

The mallard perched next to a babbling brook,
and I stared at the fowl with a lean hungry look.
Spurred by visions of a Peking duck feast,
I walked slowly up to the hapless beast.

But the hunt quickly came to a surprising end,
when the duck quacked, "How are you, my fine-feathered friend?"
I knew it meant either a loss of my mind,
or a real close encounter of the avian kind.

I replied, "Did you really and truly just speak,
or has all the excitement made my mind weak?
Perhaps this is part of a most clever prank,
designed to amuse someone of high rank."

The duck said, "No, this is not a diversion,
our purpose today is a wondrous excursion.
Many of your questions will soon be cleared up,
in the cave of Change One to the well known MACSUP."

The wise duck didn't wait for my reply,
he must have known innately that I would comply.
So when the quacker set off down the path,
I followed to avoid the odd creature's wrath.

As we traversed the trail 'cross the forest floor,
I thought about this cave a little bit more.
Was it a new MAC training requirement,
or was it where flyers went on retirement?

My thoughts ceased when I saw the cave's mouth,
which was only a few dozen yards to the south.
I had a sudden desire to go north,
yet the mallard and I went steadily forth.

In the dark of the cave my psychic strength rallied,
as onto a large rocky ledge we sallied.
The sight below made me question my eyes,
when I spotted a cavern of tremendous size.

I thought we had entered some giant's home,
for it seemed as large as the Astrodome.
There were folks all about working on machinery,
and wrecked aircraft hulks made up part of the scenery.

"This," the duck told me, "is the uppermost floor,
and in our journey we shall see two more.
Now on this first deck I will shed some light,
by explaining to you these poor workers' plight."

"These people are technical troops in MAC,
here because of good sense that they lack.
For instead of practicing Tech Order compliance,
they all engaged in Tech Order defiance."

"Some ignored T.O.s on Jet Fuel type 4,
because they imagined that they knew lots more.
So they learned fuel management the difficult way,
with wasteful fires as the price to pay."

"Some tried to do an engine job right,
but attempted it without a Tech Order in sight.
They thought that they were technical masters,
until their mistakes caused awful disasters."

Honorable Mention, 1979 MAC Flying Safety Writing Contest

"So for those who think that T.O.s don't apply,
there is duty down here—without TDY.
They rebuild the airplanes they carelessly broke,
and they learn that the Tech Orders aren't just a joke."

"For T.O.s run the gamut from airframes and FODs,
to circuitry, gauges and classes of mods.
But the Tech Orders alone are simply no good,
if technicians won't use them as use them they should."

The duck then said it was time to press on,
and I moved as obediently as a chessboard pawn.
We made our way through the cave's dark passes,
but our speed was as slow as ice cold molasses.

Despite the fact that the lighting was poor,
we finally arrived at the number two floor.
The room was lit by a computer's glow,
exposing Link trainers lined up in a row.

The duck said, "Crews are confined in these training tubs,
practicing the use of their manuals and pubs.
These crewmembers treated their books like the dregs,
Sadly neglecting their checklists and regs."

"The simulators really are very nice,
for they rid every crew of the pub misuse vice.
The habit is broken by error and trial,
without sending planes to the MAC 'Class Six' pile."

"Regs, manuals, and checklists are needed,
but like T.O.s, only serve when they're heeded.
For proper pub use can keep crews from harm,
while misuse can lead them to buying the farm!"

The mallard's speech ended on a note of fear,
but the message came through to me loud and clear.
The duck then went off in the shadowy gloom,
and I followed into a most eerie room.

This was the last of the cave's three stages,
a classroom complete with desks, charts, and pages.
There were numerous people absorbed in deep study,
and no one was talking except for my buddy.

"These people," said the duck in low voice,
"are here in the cave by personal choice.
They are all commanders in the Air Force,
and all are attending a safety course,"

"The program's called: 'Pubs and the Commander's Role,'
the class is about the pub abuse toll.
The toll amounts to very high losses,
which must be stopped by these Air Force bosses.

"There must be a stricter attention to detail,
or else all the pubs' directives will fail.
Air Force rules must be followed to a 'T',
and commander involvement is surely the key.

"So commanders come down here for instruction,
and they learn the best way to prevent destruction.
They also learn to rant and rave,
and send pub misusers for a stay in this cave.

"That," quacked the mallard, "concludes our trip;
be sure to take care as you leave—don't slip.
The exit map is in MACSUP Change One,
also remember, you must not run."

"But," I answered, "I don't have the MACSUP,
in fact I don't even know which way is up.
I don't have time to post sups all day,
so you will just have to show me the way."

The duck said, "Pubs must be kept up to date;
aerospace information cannot wait.
So because you have not learned your lesson,
you will stay on for the *long* training session."

With those ominous words the duck faded from sight,
and I wondered when I would again see the light
Just then, I awoke from my torturous nap,
with *The MAC Flyer* lying unread on my lap.

But I learned we need more than quick hands and legs,
like T.O.s, manuals, checklists, and regs.
On our pubs' importance we all should ponder,
before launching into the wild and blue yonder.

ABOUT THE AUTHOR

A native of Charleston, South Carolina, Lieutenant Kinsley graduated from the Air Force Academy in June, 1977. He completed Undergraduate Helicopter Training at Fort Rucker, Alabama in 1978 and is currently assigned to Detachment 5, 40 ARRS, Edwards AFB, California, flying UH-1N helicopters.

Even light traffic at an airport doesn't eliminate the danger of a midair collision.

A Lesson in Defensive Flying

by Maj James G. Gibson II
Supervising Editor

Judging by a recent upsurge in the number of reports of near misses from both civilian and military aviators, the potential for a midair collision is an ever-present and very real threat. Such a danger seems ironic, given the excellence of most controllers, the sophistication of their radars and computerized systems for keeping tabs on air traffic. Despite controller expertise and electronic gadgetry, however, the human element can still "Murphy" things up in a hurry, as the following example demonstrates. This incident, by the way, didn't take place at O'Hare or LAX during a peak traffic period. It happened at a small airfield, on a weekday with good weather and an experienced controller, and the three airplanes involved were the only traffic in the area at the time.

Principal players in this little drama are an Air Force CT-39 Sabreliner and a Navy P-3 Orion. Making a brief appearance to add a small element of challenge for the approach controller is a light civilian aircraft. As the curtains part, the CT-39 is approaching the airfield from the south, while the P-3 awaits takeoff clearance on the southbound runway. Passing through the southern quadrant of the airfield's approach control airspace on a westerly heading, the civilian air machine is ginning along at 3,000 feet.

Routinely, the CT-39 is cleared for further descent to 2,000 feet. As the P-3 departs the southbound runway, the controller realizes that he has it and the civilian airplane both assigned to 3,000 feet and headed for the same general chunk of sky. He amends the P-3's altitude to 2,000 feet, forgetting for the moment that he has already cleared the Sabreliner to that altitude.

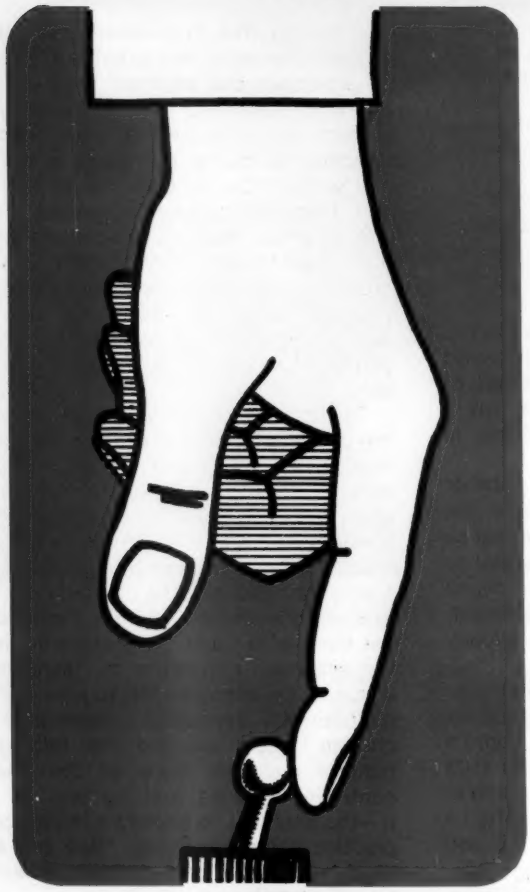
Checking to see if the Air Force biz-jet's crew has the field in sight, the approach controller receives confirmation and clears them to begin a right downwind for a visual approach and tells them to contact the tower. Sitting there looking at his radar, it takes the Scope Watcher nearly half a minute to realize that he now has the P-3 and CT-39 on a collision course at 2,000 feet. Desperately, he instructs the Sabreliner to climb immediately to 3,000. Unfortunately, the CT-39 crew has already switched to tower frequency. *Fortunately,* however, the alert pilots spot the window-full of P-3 in time to dive and bank to the right. The two airplanes barely avoid a collision, passing within 100 feet of each other in the process. The only casualties resulting from this near catastrophe are some frazzled nerves and additional grey hairs for the pilots, plus a coffee-stained uniform for one of the passengers whose cup was dislodged in the abrupt avoidance maneuver.

Although this is a reasonably clear-cut case of controller error, the purpose of the article is not to browbeat our brethern who while away the hours in darkened rooms hunched over radar scopes. By and large, they do an admirable job of handling air traffic and keeping the "surprises" and hassles to a minimum. Controllers are human and, therefore, subject to making mistakes, just like all of us. And, as this story points out, they don't have to be inexperienced or under excessive pressure from heavy traffic or emergencies to get their act fouled up. All it takes is a bad day, or even a bad couple of minutes, and you could find yourself handed off to that final controller in the sky.

The important thing is, the aircrew still has the opportunity and obligation to save their own bacon anytime the viz is good. The secret is keeping those eyeballs on 270-degree sector scan and paying attention to what's going on in your airspace. A couple of things to be aware of include the fact that even though the controllers are supposed to keep traffic off your back while you're executing a visual-approach clearance, they can get busy with other more pressing demands and neglect their obligation to "sanitize" your airspace. So you may be left to your own devices for maintaining separation, especially after you change frequencies and start talking to another handler such as tower or the final approach controller. There's just no way to get around it—the best way to prevent a midair collision is to practice defensive flying. "See and avoid" is an ideal backup any time visibility outside the cockpit will permit.

Making a bad move while flying an airplane can be disastrous. Here's one idea why this sometimes happens.

Finger Trouble



by Mr. Roger Green
RAF Institute of Aviation Medicine

Last time I wrote an article for an air safety magazine, one or two particularly perceptive readers pointed out to me that I was an ignorant fool writing about something which I did not understand. I feel I can avoid such criticism of *this* article by admitting straight away that I do not understand the problem. My only mitigating plea is that I don't believe anybody else understands the problem particularly well either.

The subject I want to discuss is why we sometimes do things we don't specifically intend to, or sometimes do one thing when we intend to do another. We might call these "actions not as planned." Curiously, as I sat down to write this article, my wife, intending to give the cat some milk, put down an empty bottle on the kitchen floor and placed the bowl of milk outside the front door. I expect your wives (perhaps even one or two of *you*) have done similar things. In fact if you try to think back to things that you have done, or nearly done, like this, there are some common mistakes which you probably remember having made. You may

have gone to the bathroom to wash your hands and found yourself cleaning your teeth. You may have been making a cup of tea, started thinking about something else, and found that you had put six or seven spoonfuls of sugar into the cup. And who hasn't tried to change into fourth in a car with only three gears? Well I haven't, of course, but I am told that other people do these things all the time. The point of this article is that people do similar strange things in aircraft.

You don't believe me? Well I know one pilot who does. While taxiing back to the ramp after landing he decided to raise the canopy to cool off; however, he raised the landing gear by mistake. (I should like to point out to those pedants among you that I am well aware that it is impossible to raise the gear of any aircraft when on the ground; it is the aircraft which descends.) From a practical safety point of view, it is important to try and understand the mechanism of such errors in case there is anything that can be done to reduce their incidence.

Figure 1 shows a simple "black box" model of some of the stages that information must pass through when any skill is being exercised. It shows that although there are a large number of events going on in the world to which we could attend, that our attention process must somehow whittle down these events to a manageable number to allow the limited-capacity decision channel or central processor to deal with them. The output of this processor is some form of motor activity such as limb movement or speech. Such a model rather suggests that we can attend to only one thing at a time, yet we know that it is quite possible to do two or three things all at once. For instance we can drive and talk simultaneously—as long as the driving is not too demanding. Clearly then, if something is well practiced, we don't need to concentrate very hard on its execution.

The literature on skill sometimes divides skill acquisition into three phases: the cognitive phase—in which you do need to concentrate on each aspect of your activity; the associative phase—during which individual components of the skills are "welded" together; and the automatic phase—where the whole skill has become laid down as a "motor program" or "subroutine" which can be executed quite automatically once an initiation decision has been made by the central processor.

We might reasonably insert another box in our diagram (see *Figure 2*) to suggest that we have a store of these motor programs or subroutines (e.g., for walking, talking, driving, flying, putting on earrings) which are activated by some conscious decision and whose execution is occasionally monitored by the central processor (to make sure they are running), but which use sensory information and control motor output quite independently of the central processor.

Although it is simplified, such a model enables some structure to be put on the variety of errors that we see, and there are clearly a number of places in the model where error can occur. First, it may be possible to engage or

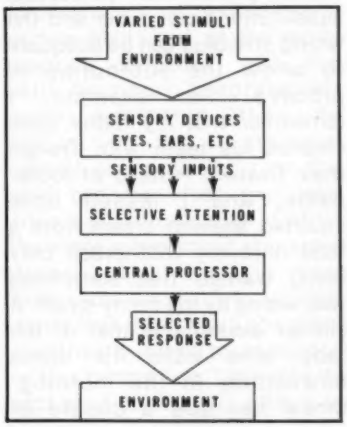


Figure 1

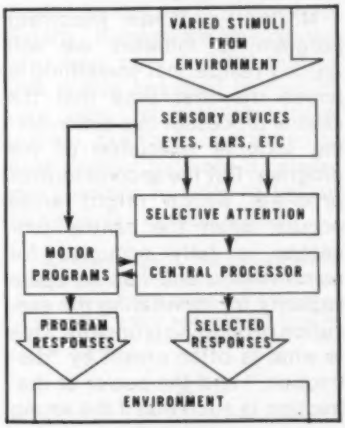


Figure 2

activate the wrong program, i.e., the right decision is made but the wrong action is taken. An example of this would be our earlier case of the pilot who raised the gear, or a man who picked up the ringing phone and shouted "Come in!" to the person at the other end. Another example of such an incident would be the Jaguar pilot who put out the speed brake when he meant to put out the slats. These examples do seem to show that in such errors the confused subroutines usually have something in common. In the wheels-up aircraft, the landing gear and canopy selectors are operated by the same hand; "come in" and "hello" are both verbal responses to some form of auditory announcing signal; and in the Jaguar, speed brake and slats are both operated with the left thumb. From the point of view of our model, these three errors are identical in nature.

Normally, if an incorrect program is initiated we will quickly realize that something is amiss the first time that the central processor has a monitoring look at execution of the program. But the second form of problem which might arise occurs when the central processor is fully occupied for some reason and has no spare capacity for monitoring the execution of ongoing programs. This is what is often meant by "distraction," and the power of distraction is such that if the wrong subroutine has been initiated it may be executed for a long time before errors are noticed. Dumping seven or eight spoonfuls of sugar into a cup of tea while distracted is a good example. One of my favorite such stories concerns a man who went into a restaurant during WW II and saw some lemon meringue pie, which was then scarce, but of which he was particularly fond. He bought a slice and was looking at it—savouring it for a while—when a friend joined him. They had an argument about the American election. When it was over he realized, to his disgust, that he had eaten the pie but had no recollection of doing so.

Another feature of the distraction problem is that motor programs seem to be laid down in fairly general terms—probably for maximum flexibility—and if the central processor does not track things at certain critical points then perceptual substitutions can occur and the wrong stimulus can be adequate to allow the subroutine to proceed. For example, I remember that my father once cleaned his teeth with Tru-gel (hair fixative) instead of toothpaste, and I myself have squirted shaving cream from a tube onto my toothbrush only being warned that something was wrong by the funny smell. A similar example is that of the lady who used to come downstairs in the morning, throw her dog a couple of biscuits and then put on her earrings. One morning she threw the earrings to the dog and it was only when she had trouble putting them on that she realized that she was trying to fasten dog biscuits to her ears.

The stimulus need not be visual of course, it may be tactile or kinesthetic. It appears that for some pilots, gear-up and gear-down programs are in fact just different branches of the same program. The behavioral routine might thus be written, "Initiate. Put hand on landing gear handle. If up, move down. If down, move up." Obviously such a program will work well most of the time, but if for some reason the wheels are already down when the central processor intends to initiate a gear-down, then gear-up action may well result. Personally, I know of at least two incidents where this happened. In one case the pilot of a light aircraft was returning to his own airfield. Immediately after takeoff he checked the fuel gauge, realized that he had less petrol than he thought and cursed himself for not refueling. With his central processor thus occupied (distracted) he failed to initiate the gear-up program and dragged his undercarriage all the way home. Obviously, when he reached the field he was very concerned with making a straight-in approach and getting on the ground as quickly as possible. But when he initiated his landing-gear program, he

clearly didn't monitor its execution well enough because he proceeded to retract the already lowered wheels!

A last example, which I must relate, illustrates how complicated these "actions not as planned" can be and concerns a man who went out to his back yard in order to fill up his coal scuttle. On returning to the house, he felt the call of nature. He went into the W.C. and, without realizing what he was doing, proceeded to pour all the coal from the coal scuttle into the toilet.

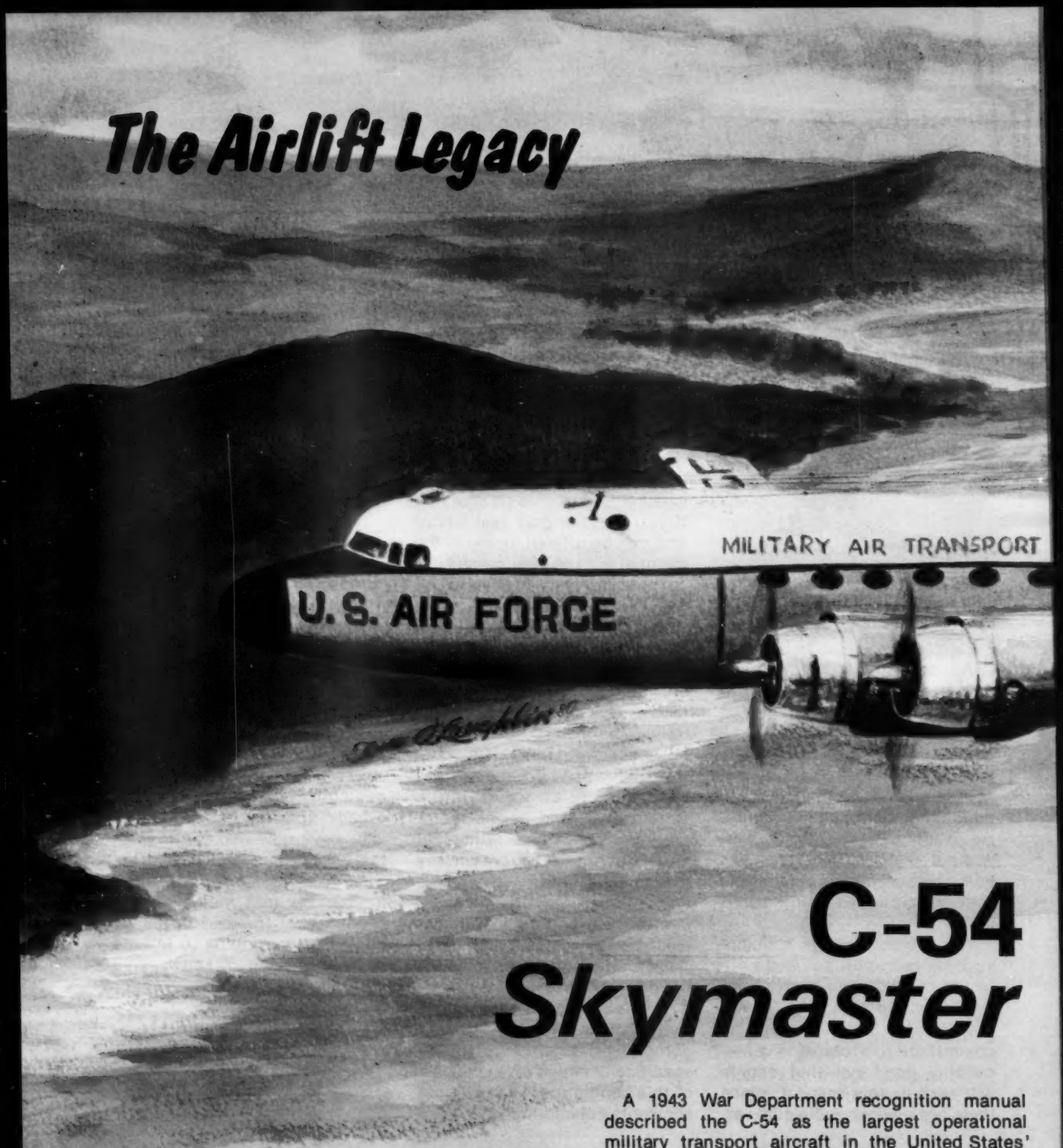
When faced with a problem such as this, psychologists are bound to ask whether there are any individual differences which predispose some people to commit such errors. It is a reasonably good bet that people will vary in this respect, since there are obvious individual variations in most other physiological and psychological parameters that one can think of. You may have already decided that many of the examples which have been described above are, in fact, examples of what might be termed "absent mindedness," and we all know that some people are clearly more absent minded than others. While there are no formal tests to identify individuals who are likely to do this sort of thing, you probably already know whether you tend to do it or not. If you *do*, the only real advice that can be offered to you at the moment is to be jolly careful.

There is one last observation that I would like to make about this topic. Earlier, I talked about these subroutines being laid down as a result of the process of training and experience. In fact, one could almost define training as the process of laying down such programs. It is ironic that as one becomes more experienced at executing a certain skill, and as the motor program concerned with that skill becomes progressively more automated, then the amount of central processor control or monitoring over that skill becomes less and less. Thus a situation exists in which the more experienced you are at doing something, the more likely you are to find yourself doing that thing when you didn't specifically intend to. In support of this contention, I can cite the accidents concerning wheels-up landings which have occurred in the RAF in the recent past. All of these accidents resulted from the errors of experience which have been discussed here and happened not to novice aircrews but to squadron commanders and other highly experienced and apparently competent crewmembers. Probably all of them regarded themselves as careful and able pilots and felt that they would have been the last people to make such mistakes. If it can happen to them it can happen to anybody.

How then can these mistakes be avoided? I must return to the point that I made in opening this article and say that I don't know. However, I suspect that one can discipline one's self to some extent to ensure that all skilled actions are properly monitored by one's central processor. It is especially important to do this if there is any suspicion that the capacity of the central processor is reduced or otherwise occupied by fatigue or distraction. Finally, if there are any readers who have now decided that all this article has said is that it's very easy to get into finger trouble, but that you have to be dead careful to avoid it, please don't bother to write to tell me so because I already know.

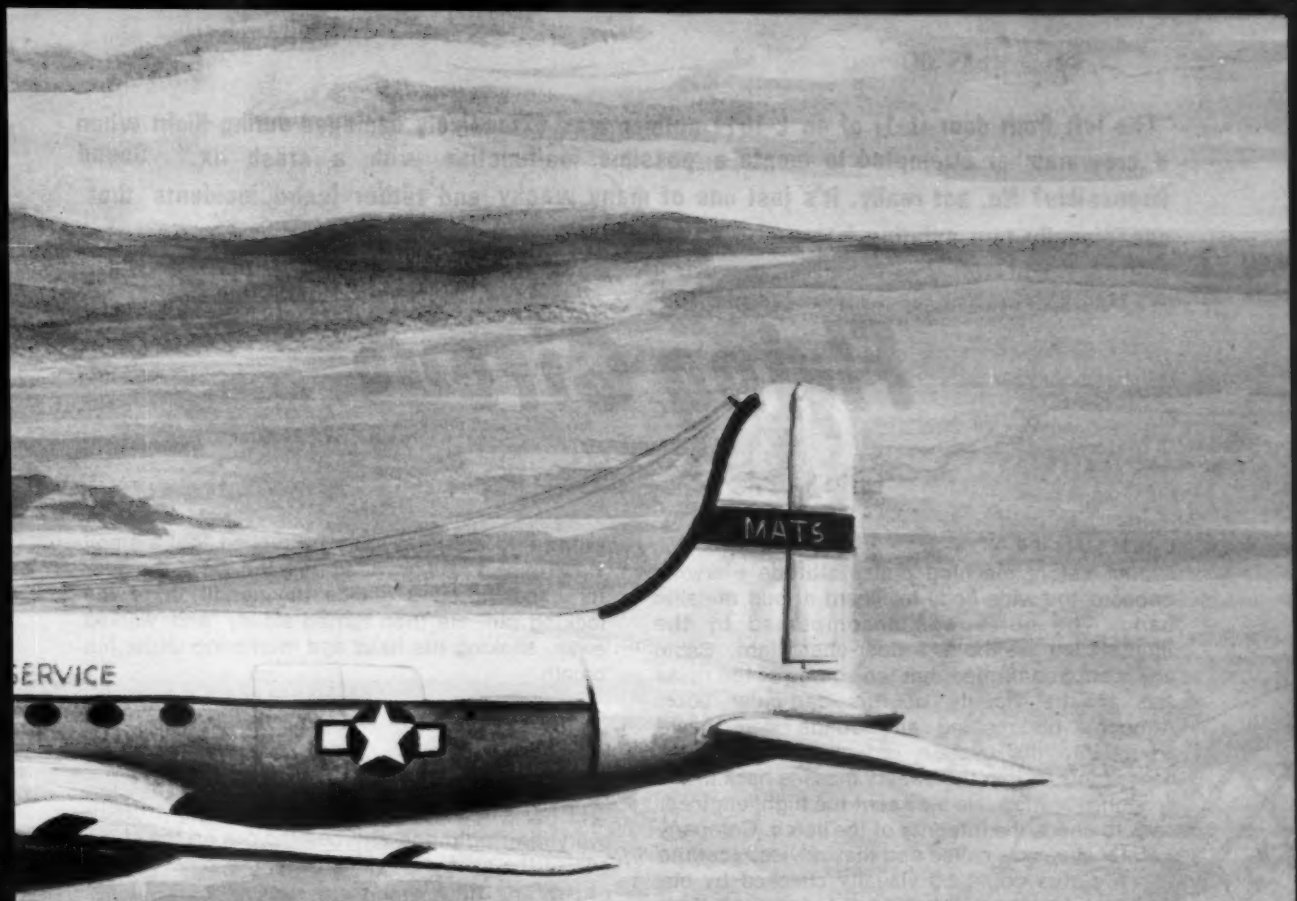
Mr. Green reports that the anecdotes in this story are all true—only the details have been changed to protect the innocent—or guilty. This article was adapted from Air Clues, *the Royal Air Force magazine. —Ed.*

The Airlift Legacy



C-54 Skymaster

A 1943 War Department recognition manual described the C-54 as the largest operational military transport aircraft in the United States' arsenal. With a wing span of over 117 feet and length exceeding 93 feet, the Skymaster grossed out at 82,500 pounds. Its four Pratt & Whitney radial engines enabled it to cruise up to 239 mph



at 15,000 feet and carry 50 troops or 32,000 pounds of cargo.

The first C-54 production model was received by the Air Transport Command in July 1942 and soon began flying critically needed war supplies and troops to every theater of operation. Its payload capability surpassed those of both the twin-engined C-46s and C-47s, and represented a quantum leap in airlift for the allies. Four-engine reliability also made flying the "Hump" between India and China much safer than in twin-engine aircraft. As a result of its wartime employment, the C-54 and its commercial counterpart, the DC-4, made intercontinental airlift of people and cargo an accepted practice. During the Roosevelt administration, a C-54, dubbed the "Sacred Cow," became the first airplane dedicated solely for Presidential use, and President Truman kept it until 1947. For his historic wartime trip to Casablanca in 1943, Roosevelt used the C-54 during the overland portions of the flight and the seaplane, "Dixie Clipper," for the overwater legs. This marked the first time any American President had flown while in office and it was the only flying junket FDR made as President.

In 1948, when Berlin was threatened with strangulation by a communist blockade, over 300 Skymasters were pressed into service, playing a crucial role in delivering vitally needed coal, food and supplies to the people of that beleaguered city. During the Korean conflict, the C-54 constituted the mainstay of the airbridge connecting the CONUS with forward areas in the Western Pacific. Some were converted to litter carriers and returned over 66,000 patients to U.S. hospitals.

The Skymaster holds a special place of prominence in the legacy of airlift. It marked the advent of a new era in reliable, long-range air transportation which today makes MAC "the backbone of deterrence."

"The left front door (L-1) of an L-1011 airliner was extensively damaged during flight when a crewmember attempted to locate a possible malfunction with a crash ax." Sound impossible? No, not really. It's just one of many wacky and rather weird incidents that occasionally turn aviating into a . . .

Flying Circus

L-1011 Gets the Ax

Just before reaching cruise altitude everyone onboard the wide-body jet heard a loud metallic bang. The noise was accompanied by the illumination of the L-1 door-open light. Cabin attendants confirmed that the source of the noise was in the vicinity of this particular door. Although no rushing air sounds were heard around it, the captain ordered all first-class passengers to join the sweaty masses back in the economy section. He also sent the flight engineer back to check the integrity of the hatch. Company maintenance was called and they advised that the door's status could be visually checked by observing a locking pin behind the door paneling, about half way up the left side. First the FE used a screwdriver to try and pry the panels back, but it wasn't getting the job done, so he grabbed a crash ax and went to work.

After tearing up the left side of the door the crewman still could not see any pin. Then maintenance called back to say they had misinformed the crew about the locking pin's location. It was not in the left side, they admitted, but at the top of the door. Not only was the flight engineer still unsure about the integrity of the door, he was developing a few doubts about the credibility of some of the folks on the ground, as well. Perplexed but undaunted, the engineer again applied the ax to the battered portal, this time near the top. The pin, when finally located, was found to be extended halfway into the fuselage door frame receptacle, confirming its locked state and relieving everyone's mind.

After landing at destination a "knowledgeable" maintenance person came aboard to check things out. Peering at the mangled door with a quizzical look, he asked why it was so heavily damaged. When told the long story he replied that a small viewing port was provided near the top of the door for checking at a glance the condition of the locking pin. He then turned slowly and walked away, shaking his head and mumbling under his breath.

—Adapted from BOAC's *Safety Review*

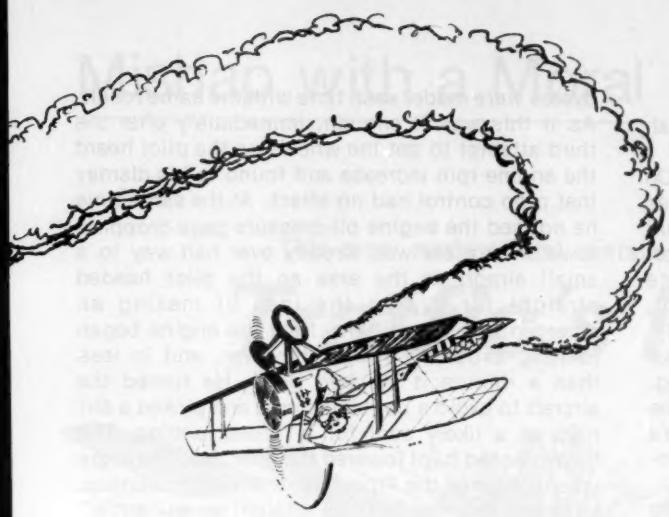
Bunky's Dilemma

Here's a classic example of a guy doing virtually everything right and still coming out on the short end of the stick or, in this case, the other end of up.

Since "day one," pilots are taught, briefed, and cajoled about a single fact concerning thunderstorms, and that is: Don't mess with 'em! After receiving a weather briefing, one luckless pilot proceeded on his way in an aero club bugsmasher. About 50 miles from his destination, he contacted approach control for an update on the weather and was told there was only one thunderstorm to the north and it was not expected to hit the airfield. The aeroclubber pressed on with the firm conviction he had done everything right, including thunderstorm avoidance.

After he landed, however, the storm that wasn't supposed to hit the field promptly did what it was briefed not to do. It clobbered the airport with heavy rain and high winds, the first gusts of which struck as the hapless pilot was taxiing to the ramp. It picked up the tail of his aircraft and flipped it completely upside down with the flustered flyer and his passengers tumbling inside. Fortunately, no one was injured but the pilot was heard to say that he wished he'd stayed in bed.

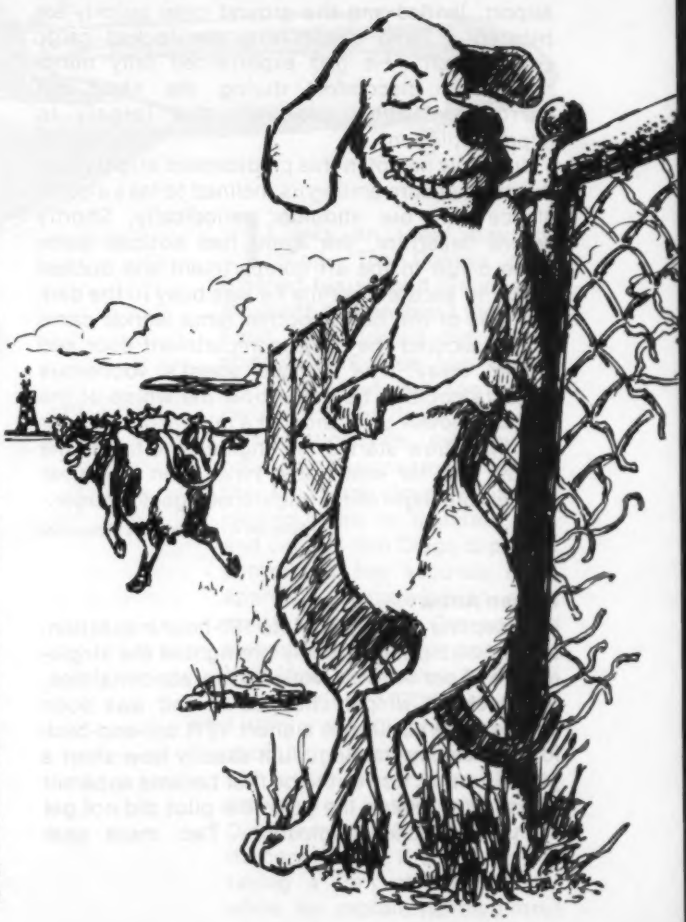
—Adapted from *TAC Attack* (Nov 78)



Animal Farm

Beginning a take-off run in his P-3 Orion, the Navy pilot saw a dog suddenly run out onto the runway directly in the path of the aircraft. Thinking he had hit the pooch with one of the props, he aborted the takeoff. But as the aircraft completed a 180-degree turn on the runway the pilot saw the dog standing at the side of the runway. Later, the Navy flyer recalled that the crafty canine was looking directly at him with a strange, almost smiling expression on his face. Whether the dog was actually snickering could not be confirmed because soon after the incident a boy came through a hole in the perimeter fence, put a leash on the wayward whelp and led him away.

Later that same day at the same airfield, another P-3 was landing when suddenly a group of *cows* came through the same hole in the fence and sashayed onto the active runway, 1,000 feet beyond the Orion's landing point. Fortunately, when the bovine trespassers saw and heard the approaching aircraft bearing down on them, they beat a hasty retreat, leaving only a tell-tale calling card on the asphalt in the form of processed FODder. Investigators concluded that "unknown persons" cut holes in the fence allowing various unattended animals to wander out onto the runway.



continued

Knock, Knock, Who's There

While taxiing out for takeoff, the flight attendants aboard a Boeing-727 jetliner heard a thumping noise coming from the cabin floor. "Oh that's just flat spots on the tires. It'll go away as soon as we're airborne," came the confident response from the cockpit. After takeoff, however, the sounds continued. As the passenger plane climbed through 15,000 feet, a flight attendant, who just happened to have a megaphone handy, brought it back and positioned it over the floor from where the peculiar sounds were eminating. "If there's anyone down there, knock twice," she said through the mouthpiece. To everyone's astonishment, two crisp knocks came immediately from underneath the floor.

After dumping fuel, the flight returned to the airport, landed and the ground crew quickly extricated a ramp agent from the locked cargo compartment. He had experienced only minor respiratory discomfort during the short but harrowing flight, probably due largely to hyperventilation.

Just how he got in this predicament might make the most secure among us inclined to take a quick glance over our shoulder periodically. Shortly before departure, the agent had noticed some loose cargo in the aft compartment and ducked inside to secure it. While he was busy in the dark confines of the hold, another ramp worker came along, secured the cargo compartment door and walked away. The trapped agent's vociferous protests couldn't be heard over the whine of the auxiliary power unit, and just a minute or two later the flight crew started the engines and taxied the aircraft out for what must have been the most memorable flight of the anguished agent's career.

—Adapted from Pan Am's *Crosscheck*

Broken Arrow

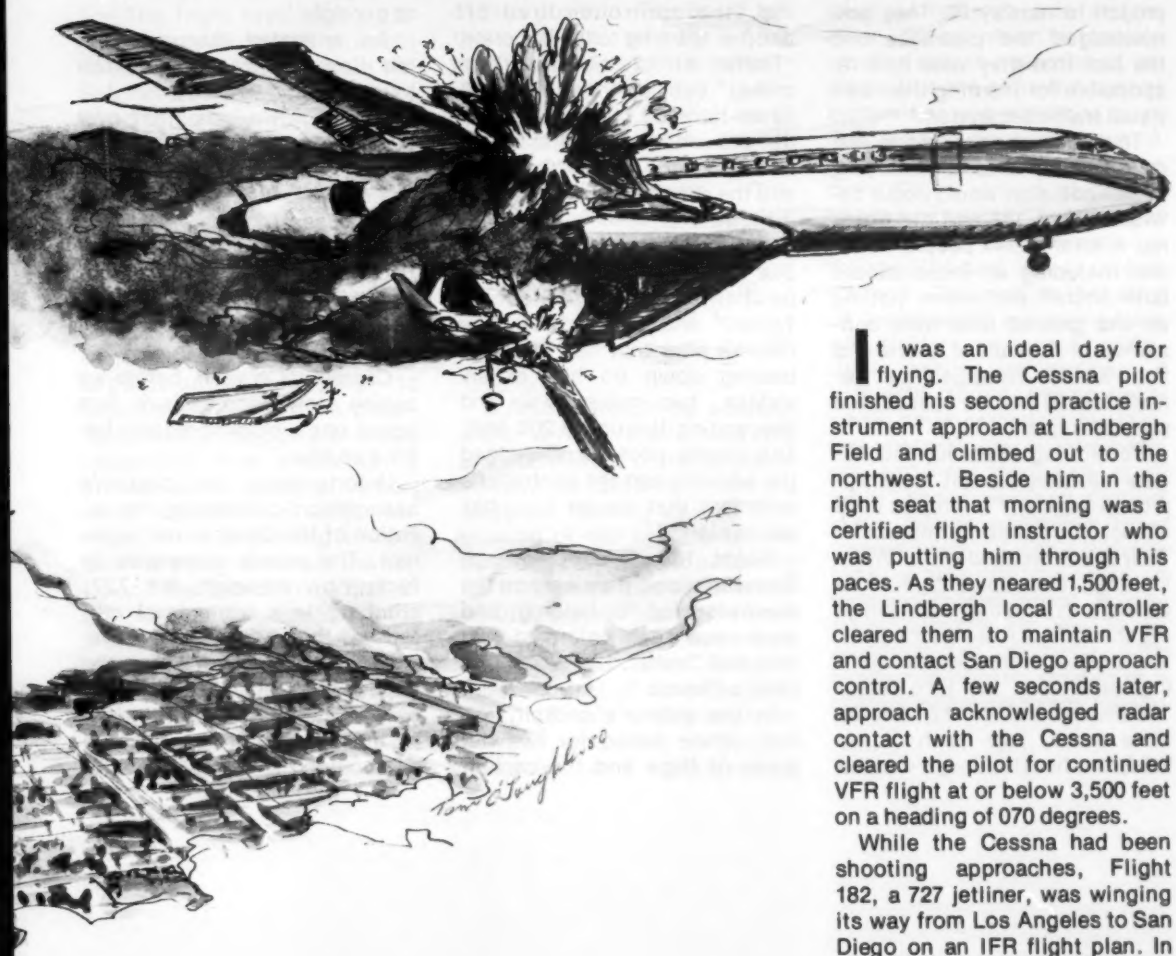
Accepting it fresh from its 100-hour inspection, an aeroclub pilot routinely preflighted the single-engine Piper Arrow. Noticing no abnormalities, the weekend winger strapped in and was soon slipping the surlies on a short VFR out-and-back for proficiency training. Just exactly how short a flight it might turn out to be first became apparent when, after raising the gear, the pilot did not get an up-and-locked indication. Two more gear cycles were made, each time with the same result. As if this wasn't enough, immediately after the third attempt to get the wheels up the pilot heard the engine rpm increase and found to his dismay that prop control had no effect. At the same time he noticed the engine oil-pressure gage dropping toward zero. He was already over half-way to a small airport in the area so the pilot headed straight for it with the idea of making an emergency landing there. Next the engine began running extremely rough, however, and in less than a minute it stopped dead. He turned the aircraft to avoid a populated area and picked a dirt road as a likely spot for a forced landing. The hard-pressed pilot lowered the gear, kept the flaps up and aligned the Piper with the road. His lineup, however, was not quite as straight as an "arrow" because he touched down just off the right edge. After careening about 100 feet, the right gear bogged down momentarily in the soft shoulder, spinning the aircraft to the right. The Piper then slid sideways at about a 60-degree angle. Such stressful sidewinding collapsed the nose gear and sheared off the right-main gear. The broken arrow finally came to a stop and the pilot exited the plane before the cloud of dust had even settled.

When investigators started looking into the mishap, they discovered there was absolutely no oil left in the engine after the crash landing—all of it had poured out of the quick-drain valve in the nose wheel well. The valve was wide open with the nose gear scissors assembly resting against it. The wrong type of valve had been installed during the inspection and it protruded into the wheel well just enough to foul the nose gear and open the valve, quickly draining the engine dry. A questionable mechanic had ordered the valve and when it arrived with a slightly different part number than the one originally ordered he *thought* it was a suitable substitute. He didn't bother doing a retraction test because he was satisfied with the apparent clearance between the gear and the valve. For want of the correct drain valve, which cost just a few bucks, a $25,000 airplane had to be sold for scrap and a pilot narrowly escaped what could easily have been a fatal crash. It's sorta like getting an arrow in the backside.

Mishap with a Moral

This crew made a fatal mistake after acknowledging . . .

Traffic's in Sight



It was an ideal day for flying. The Cessna pilot finished his second practice instrument approach at Lindbergh Field and climbed out to the northwest. Beside him in the right seat that morning was a certified flight instructor who was putting him through his paces. As they neared 1,500 feet, the Lindbergh local controller cleared them to maintain VFR and contact San Diego approach control. A few seconds later, approach acknowledged radar contact with the Cessna and cleared the pilot for continued VFR flight at or below 3,500 feet on a heading of 070 degrees.

While the Cessna had been shooting approaches, Flight 182, a 727 jetliner, was winging its way from Los Angeles to San Diego on an IFR flight plan. In its cockpit, the first officer was taking a turn at the controls while the captain handled most of the radio calls. A flight engineer and a deadheading pilot

were also up front.

Nearing Lindbergh at 11,000 feet, the 727 reported in to San Diego approach and was cleared for descent. As they passed through 9,500 feet, the pilots reported the airfield in sight and were cleared for a visual approach to runway 27. They acknowledged the clearance and the fact that they were now responsible for insuring their own visual traffic separation.

The stage was set, and in just over two minutes a horrifying midair collision would occur between Flight 182 and the Cessna. A total of 144 people would die, including all those aboard both aircraft and seven victims on the ground who were consumed in the rain of debris and fire which damaged or demolished 22 homes beneath the point of impact.

Continuing inbound, the 727 crew received a call from approach control, ". . . traffic at 12 o'clock, one mile northbound." They acknowledged with, "We're looking," but apparently had no success in locating or identifying the traffic. A few seconds later, another more specific warning came over the jet's radio. "Additional traffic's 12 o'clock, three miles, just north of the field, northeastbound, a Cessna 172 climbing VFR out of one-thousand-four-hundred."

"Okay, we've got that other twelve," responded the copilot.

As the two airplanes continued in approximately the same direction, with the jet descending and the Cessna climbing, the controller fired off another warning to the 727 crew, "Traffic at 12 o'clock, three miles, out of one-thousand-seven-hundred." After checking out the window, the first officer acknowledged with, "Got 'em," and the captain added, "Traffic's in sight."

Approach control cleared the pax jet to "maintain visual separation and contact Lindbergh Tower," and then advised the Cessna pilot that he had a 727 bearing down on him at six o'clock, two miles away and descending through 3,200 feet. The private pilot acknowledged the advisory and the controller's comment that the jet ". . . has you in sight."

Flight 182 called Lindbergh Tower to report they were on the downwind leg for landing, and were once again informed that they had "traffic, 12 o'clock, one mile, a Cessna."

In the airliner's cockpit, the first officer called for five degrees of flaps and the captain asked if the latest Tower call was for the traffic they had been looking at. "Yeah, but I don't see him now," replied the first officer. Soon thereafter, Flight 182 reported to the local controller, "Okay, we had it a minute ago," adding, "I think he's passed off to our right."

An animated discussion of the Cessna's whereabouts followed.

Captain: "He was right over there a minute ago."

First Officer: "Yeah," then a few seconds later, "Are we clear of that Cessna?"

Flight Engineer: "Supposed to be."

Captain: "I guess."

Extra pilot in jumpseat: "I hope so."

Captain: "Oh yeah, before we turned downwind, I saw him about one o'clock, probably behind us now."

Unfortunately, the captain's assumption concerning the location of the Cessna was incorrect. The private plane was, in fact, now beneath the 727, climbing in a wings-level attitude as the jet continued to descend. Witnesses who saw the impact reported that Flight 182 banked slightly to the right just as the Cessna pitched nose up and collided with the 727's right

wing. Almost immediately, both mortally damaged aircraft plummeted 2,500 feet to the ground in flames.

Several points worth pondering came out of the NTSB investigation of this needless tragedy.

• The flight crew of the 727 received credit for the probable cause of the accident from the Safety Board because they failed to comply with the provisions of a clearance to maintain visual separation, which included the requirement that they inform the controller when they lost sight of the Cessna.

• Sharing the blame, said the Board, were air traffic control procedures which "authorized controllers to use visual separation procedures to separate two aircraft on potentially conflicting tracks when the capability was available to provide either lateral or vertical radar separation of either aircraft." It is interesting to note that 19 seconds before the collision, the approach controller got a "conflict alert" warning from the radar-computer monitoring the courses of the 727 and Cessna. He called Flight 182 and notified them about the Cessna, and they acknowledged visual contact with it at that time. According to ATC rules, no further warning was required until (or unless) the 727 pilots reported losing sight of the Cessna. Even so, the controller also called the Cessna pilot and advised him of the fact that Flight 182 was in his six o'clock position. The Board felt that failure of the ATC procedures to require a controller to notify a pilot that his aircraft was in a "conflict alert" status deprived both aircraft crews of one more chance to avoid the collision. One dissenting Board member felt strongly enough about the inadequacy of the traffic control procedures that he assigned *equal* responsibility for the accident to them and the 727 crew.

• Also coming in for a certain share of the blame was the Cessna pilot. For no apparent reason, he deviated from his assigned heading of 070 to a heading of 090 about a minute before impact,without informing the controller. Had he remained on 070, projections of his track indicated the two planes would have passed with about a thousand feet of room to spare. The Board emphasized, however, that even this unannounced and unexplained heading deviation by the Cessna pilot did not relieve the overtaking 727 crew from their responsibility to pass "well clear" of the light aircraft.

Final Comment

Several subsequent incidents in the Lindbergh area and in other locales, which fortunately resulted only in near misses, indicate that the air traffic control system has some definite bugs that need to be worked out. A number of recommendations are currently in various stages of implementation, but in the meanwhile, alert heads-up flying is the best way to protect yourself. One practice that can't be overstressed is keeping track of traffic in your vicinity — seeing and avoiding, if you will. You've got to know where other potentially conflicting airplanes are in relation to you and your flight path at all times, and if you lose sight of them, let the controllers know immediately. At the speeds today's airplanes fly, even in terminal control areas, it only takes seconds for you to be jousting for airspace with another aluminum charger in a contest where everybody loses.

DEJAVU

Kelly AFB, Texas
(elevation 690 feet)

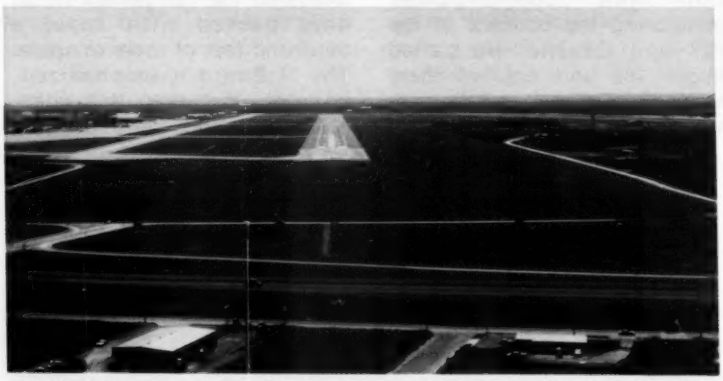
Located five miles southwest of San Antonio, Kelly Field is just about an ideal location for an air base. Terrain in the local area is low and flat. Numerous alternates are available, although you seldom need one because weather is great nearly all year 'round — except for occasional early-morning fog and summer thunderstorms. There are two runways and plenty of ramp space available. Runway 14/32 is a 7,314-foot long, nonprecision strip with jet barriers on both ends, high intensity runway lights and no overruns. It is not recommended for high-speed aircraft when wet. The primary runway, 15/33, is 11,500 feet long, 300 feet wide, and features all the amenities for both precision and nonprecision approaches. A wide parallel taxiway to the east of 15 can be easily mistaken for the runway. Plenty of sources exist for commercial and private local air traffic, so be alert. Avoid the control zones for the International Airport, 11 miles northeast, and Stinson Muni, seven miles southeast of Kelly. VFR traffic should also keep clear of Westside Air Park, five miles west of the base. Go-arounds from either runway present little hazard, although the same can't be said for the risks of overindulging in the area's world-famous cuisine, if you're lucky enough to RON in the Alamo City.

Historical Note: The big airplane parked to the right of runway 15 is the XC-99, grandpappy of today's giant airlifters (see Jan 1979 *TMF* "Airlift Legacy").

—Adapted from ISD-Q8-1550

Numerous airports within 25 miles of Kelly contribute to high traffic density throughout the year.

Runway 33 seen from about two-miles; runway 32 (7,314 by 150 feet) diverges to the left. Airfield complex is on the right.



On final for runway 15, the large parallel taxiway to the left might be mistaken for the runway during periods of poor visibility.

C.R. TERROR

Our hero slips the surlies with visions of Vegas and vino swirling in his head, but his "trusty" single-engine Mooney comes to earth far short of its intended destination

"Oh, that's wonderful!" squealed Tassels, giving her Bulbous Boyfriend a big hug. "I can't wait to tell Rotina. In fact, I'll call her right now."

"Simple things make women so happy," the Chauvinistic Cherub sighed as he watched Tassels bounce to the telephone.

C.R. had just yielded, with minimum coercion to his Ms's request that he fly her and Rotina to Las Vegas for a giant Greek spring carnival being thrown by none other than Jimmy himself. Her Greek girlfriend was furnishing the magic carpet for the trip—her brother's private Mooney.

"Don't forget to copy down the plane's N-number," he called after Tassels.

Friday morning the sun peeking over the mountains east of L.A. was barely able to penetrate the smog. On his way to the muni airport, C.R. stopped by Norton's weather shop to check on his intended route of flight. The forecaster had only doleful predictions—no VFR all day. "However," he added optimistically, "once you reach the high desert near Edwards you can expect clear, clean flying weather all the way to 'Lost Wages'."

Eager to be on his way, the Gambling Gastro-Gnome made a low pass through the flight planning room, giving the airways charts and approach books a cursory glance. With thoughts of retsina wine and roulette spinning in his head, he called Ontario FSS and filed an IFR flight plan from Redlands westward to Paradise VOR, then northeast toward Barstow and

Las Vegas at 8,000 feet.

A short time later, C.R. wheeled his yellow Jag onto the airport road and spotted Tassel's four-wheel-drive Zonko parked next to a tin hangar. Clad in his international-orange, hand-tailored jump suit, C.R. strode confidently into the hangar. "You ladies ready to go? Terrorific Air Taxi departs in 30 minutes for the Casino City," he announced.

"Just about set, Honey Bunch," responded Tassels. "I don't think you've met Rotina, have you?"

C.R. grunted a negative response as he sized up Ms Taylor's large ladyfriend, noting the surprising similarity of her profuse profile to his own.

"It's so kind of you to fly us to Las Vegas, Major Terror," gushed the girthsome girl. "My brother, Nick, has been on the East Coast taking care of our spice business for two months and hasn't used the plane. But I called him yesterday and he said that 'Argosy Junior' was okay for the trip."

"It looks fine to me," observed the Light-Plane Lothario, noting a thin layer of dust covering the otherwise well-kept Mooney. Climbing up the "Argosy Junior's" right wing, he opened the door and wedged himself into the left seat. C.R. was pleasantly surprised to find a full panel of avionics, including dual com-navs and an altitude encoding transponder. "Well, this is a far cry from the first single-engine plane I flew," commented the Master Manipulator. "Not much like the needle-ball-and-airspeed panel in a Piper Cub. Argo will do quite nicely," he grunted as he struggled out of the cabin. "You two put your bags aboard while I do a quick walk-around."

After three suitcases, C.R.'s hangup bag, and two 10-liter demijohns of homemade Greek wine were hefted aboard the plane, C.R. helped pull the Mooney out of the hangar. Reaching in and turning on the key, he checked the strobes and fuel quantity. The gages indicated just under one-quarter full each. "Looks like we'll need some gas," he announced. "I'll taxi over to the pumps and get it filled up for the trip."

Bringing the Mooney to a stop in front of the avgas pumps, C.R. shut down the engine and crawled out. He was met by a lanky line attendant in greasy bib overalls. "Top off the tanks, and check the oil, young man," ordered the Pompous Pilot.

"Can't do it, sir." replied the young mechanic. "We're running short on fuel. Have to limit the amount we give each customer. Where you goin'?"

"Vegas."

"I recon we can spare enough to get you over the mountains to Barstow. How about half in each tank?"

"Preposterous!" blustered the Flatulent Flyboy.

The FBO employee furrowed his brow under his grungy red baseball cap, "It's that or nothing."

"Okay, okay, I know when you've got me," relented C.R., "Pass the gas."

The refueling operation was soon complete and C.R. motioned his passengers to board the little puddlejumper. To his surprise, Rotina shoehorned herself into the aft seats, which almost disappeared completely under her bulk. C.R. manned the pilot's position and Tassels gracefully slipped into the right-front seat.

In a few seconds the Master Mixture Mover had the Mooney's engine purring and taxied to the end of the runway. Dialing 121.8 into the comm-nav radio, he prevailed upon Norton Ground Control, located five miles away, to get his clearance. After a few minutes, Mooney 542 Bravo Zulu was cleared as filed to McCarran International.

Except for using a seemingly inordinate amount of the 4,500-foot runway, the takeoff was normal. C.R. flipped the gear lever up and the electric-driven gear popped into the wells. As the Mooney strained to reach the MEA, they broke out of the top of the smog at about 6,000 feet. Just as the VOR needle swung, showing they had passed Paradise, C.R. leveled the plane at 8,000 feet and turned northeast on V-210. Adjusting the mixture control, he checked the fuel levels and was pleasantly surprised to see the right tank gage indicating about a quarter full. He reached down and moved the tank-selector lever to the left-tank position. Throttling back the engine for economy cruise the Ambient Aeronaut estimated, "Fuel's holding pretty

good, ladies, we may be able to make it all the way to Las Vegas."

For the next half hour the threesome discussed the proper preparation of souvlaki, kalamaraaria, the graceful performance of Greek dances, and the virtues of red and white Domestica wine.

Suddenly, Rotina excitedly interrupted the festive conversation, "C.R., is it okay for steam to be coming out of the wing like that?"

C.R. followed her jesture and immediately spotted fuel mist pouring out of the open cap on the left wing tank. At that same moment the engine sputtered twice and quit. The Shocked Skipper started a series of spasmodic movements of the magneto switch, mixture control, carb heat, and throttle, trying to get the engine running again. Tassels interrupted him, "C.R., Honey, it looks to me like the left tank is empty."

"So it is!" exclaimed the Addled Aviator, and he reached down and switched over to the right tank. The windmilling prop brought the engine back to life immediately. "That really burns me up," grumbled C.R. "First that stingy station attendant wouldn't top off my tanks, and then he didn't even bother to secure the caps." Checking the right fuel gage he estimated, "Well, that quarter tank should still get us to Vegas."

C.R.'s respite was short, however, within a minute, the engine coughed. He shoved the mixture control full forward; the engine ran for a few seconds, then sputtered out.

The trio of celebrants was temporarily mesmerized by the hiss of the airstream flowing over the now powerless Mooney. Argonaut Junior nosed into a gentle descent toward the desert some 5,000 feet below. C.R. deftly dialed 7700 into the transponder, picked up the mike and broadcast, "Mayday, Mayday, this is Mooney 5542 Bravo Zulu. We have an engine failure. We are just past Daggett VOR. Three SOB's, descending out of 8,000."

In a split second, the Los Angeles Center controller came back, "Understand Mooney 542 Bravo Zulu has an emergency. Say your intentions."

"Gimme vectors to an airport!" was C.R.'s suddenly soprano request.

"Okay, standby a second," the controller responded calmly. "Turn left to 225 degrees and Barstow will be at 12 o'clock, 13 miles. You're cleared for an approach. Winds 350 to 010 at 15. Call the field in sight."

Three faces pressed close to the windscreen as the Mooney's altimeter steadily unwound and their westward descent continued. Passing 3,000 feet Tassels shrieked, "There it is! The airport's at eleven . . . er . . . one . . . er, over there."

"So it is. Field in sight. Not to worry now ladies," boasted C.R. "I'll dead-stick this motorless Mooney to a graceful touchdown."

The heavily loaded little plane lost altitude quickly and by the time they were a mile out, the Pudgy Pilot was continually raising the plane's nose to try and stretch the glide to the threshold. With the airspeed decreasing dangerously close to a stall, the terrified trio spotted a final obstacle to their safe recovery: the airport was bounded by an eight-foot high chain-link fence. On short final, the top pole of the fence appeared level with the engine cowling. Tassels screeched, "We're gonna die!" and buried her face in her hands.

Just as a collision seemed inescapable, C.R. hauled back on the yoke and the Mooney hopped over the fence with the stall warning sounding. Crossing the threshold, the Lucky Leprechaun slapped the gear handle and the wheels snapped down and locked a microsecond before the tires squeaked onto the pavement. The powerless plane coasted to a stop about a quarter-mile short of the first runway turn off.

Tassels was first out of the cabin, followed by a sweat-soaked C.R. They both leaned against the aft fuselage, while Rotina struggled to extricate herself from the back seat. Descending the wing on noticeably wobbly legs, she began blubbering unintelligible apologies. C.R. chivalrously soothed, "Take it easy, m'dear, such minor emergencies are daily fare to us professional aviators. If that turkey hadn't left our fuel cap open we'd be in Vegas by now and—"

"No, no," protested Rotina. "It's my fault. My brother told me the plane was okay . . . except for the right fuel gage. I didn't think it was important since he always filled up the tanks before every trip."

"Aargggh," groaned C.R. Looking toward the ramp he pointedly observed, "There's an avgas sign over there. We can't leave the plane here; somebody else may want to use this runway. So ladies, let's push."

With the women providing power, C.R. steered the plane toward the taxiway. "This is truly a first for me," announced the World's Most Unsinkable Aviator thoughtfully, "I never expected to run an airplane out of gas and be able to push it to a filling station."

QUICK STOPPERS

A Burning Issue

Fuel only burns when ignited in the presence of oxygen, right? T'ain't necessarily so, as this incident shows.

The crew chief was draining a sump when petrol spilled on his right arm and over his face. He immediately washed his face and eyes, and removed his flight jacket and shirt. He rinsed his jacket, shirt sleeves and arm with water, and then put his clothes back on. Returning to the aircraft, he flew a two-hour mission. After the flight, his arm had turned red and felt as if it were scalded. The next morning, the red area was covered with blisters. In other words, the fuel gave him a chemical burn.

If you are the victim of a fuel spill, wash your skin with soap and water, and don't wear contiminated clothing until it is thoroughly laundered.

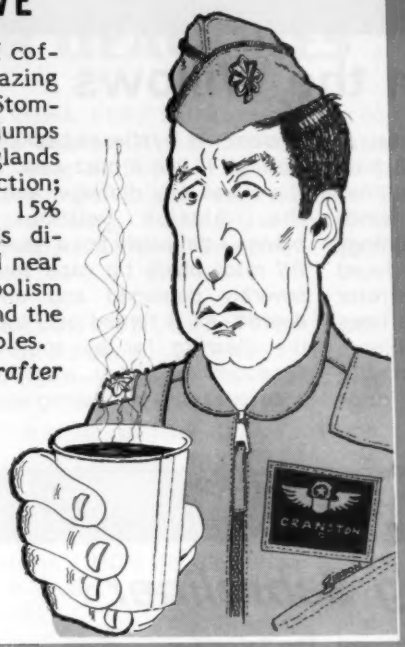
Heimlich to the Rescue

Dinner was being served high above the Pacific onboard a commercial jet liner as it sped west toward the Land of the Rising Sun. Suddenly, a call came over the intercom reporting a choking passenger. Luckily, the flight engineer had recently completed a first aid program that included training on the Heimlich maneuver, which is used to dislodge objects from a person's windpipe. Leaving his station and going below, he found an elderly Japanese lady unconscious on the cabin floor and not breathing. A flight attendant had pulled her from the seat and attempted to clear her breathing passage without success. The flight engineer kneeled from behind and performed the Heimlich maneuver four times. A large chunk of meat was forced from her throat and, although still unconscious, she began breathing fitfully. By this time a doctor arrived on the scene and began applying mouth-to-mouth resuscitation. The Japanese matron soon regained consciousness, but without the effective use of the Heimlich manuever, she probably would not have lived.

JAVA, NO JIVE

Just one cup of coffee does some amazing things to the body. Stomach temperature jumps 15%; salivary glands double their production; the heart beats 15% faster; blood vessels dilate in the brain and near the heart; the metabolism rate goes up 15%; and the kidney workload doubles.

--The Beechcrafter



Wake Turbulence Trauma

The six-ship formation of C-130s had just successfully completed an airdrop. One of the loadmasters on number five Hercules was about to close the left troop door when the aircraft suddenly slammed into the wake turbulence generated by the front four planes. Losing his balance in front of the open door, the loadmaster attempted to remain upright by holding onto the door handle with his right hand. The violence of the turbulence caused a painful right shoulder separation. To make matters worse, the shooting pain caused him to release his grip and he was thrown to the cargo floor striking the rails with his injured shoulder. Fortunately his restraint harness held while the other loadmaster closed the door. After landing, the ill-fated flyer was whisked away to the hospital for an overnight stay, followed by six weeks convalescence.

The Art of Storekeeping

Some time ago, a Boeing-707 crew was making an ILS approach in 200-and-a-half weather. Ahead of them, an L-1011 with a hydraulic problem had landed successfully. The Boeing's captain noticed that the localizer was erratic during the latter portion of the approach, but he was able to average out the excursions. The ILS problems, however, aroused his suspicions. He sighted the runway in good position to land, but went around on his hunch that something was wrong because of the erratic localizer operation. During the missed approach he spotted the Lockheed jumbo jet parked on the runway.

In another case, a DC-8 approached an airport with the weather reported at 500 and one. The first officer, who was flying, looked up at 400 feet AGL and saw what appeared to be the runway identifier strobes. However, he did a double take and realized that what he saw was the wingtip strobes of another aircraft whose fuselage was obscured in the fog. A rapid evasive maneuver prevented a midair.

These pilots were expecting the unexpected—they were minding the store. Fortunately these incidents were just close calls because the crewmembers involved had learned the trick of keeping an eye on both the front and back door, never allowing an intruder in the form of distraction or complacency to trap them. Good storekeeping requires the pilot to anticipate problems, effectively evaluate risks and delegate duties so that he or she has complete charge of the "front counter" at all times.

Wind in the Willows

The right scanner reported foliage about two or three feet from the blade tips as the H-3 pilot eased the heavy lifter into a small, tree-lined clearning. During the touchdown, high winds from the rotor wash bent the smaller saplings away from the helicopter. When the pilot reduced collective pitch after landing, however, the rotor zephyrs abated and those temporarily tilted trees began returning to their original upright positions. one tree's original upright position happened to be directly in the path of the whirling rotor system. As it reflexed back, the blade tips chewed through it like a buzz saw. The crew didn't think there was any damage, and elected to continue the mission without inspecting the blades—definitely not a recommended procedure. *All* rotor blade tip caps were later found to be severely damaged and one rotor blade was dented. As it turned out, the crew had mistaken the clearing for an approved site they were supposed to land at, which set them up for their encounter with the waving willows.

Surfing Sabreliner

Heavy spring showers left the Florida airfield drenched and the tower controller dutifully notified an approaching CT-39 that the runway was wet. The crew made a flawless approach, maintaining a final approach speed five knots slower than normal and flying the aircraft onto the runway without a flare as part of the wet-runway landing procedure designed to prevent hydroplaning. After the firm touchdown, flaps were raised as part of the same procedure. As an additional technique, the crew elected to shut down number one engine in order to decrease thrust. While the turbine was unwinding the left wing suddenly dipped and the nose pulled to the left. The skid approached 45 degrees and the pilot tried aerodynamic corrections which reduced the severity of it, but these measures weren't quite sufficient. The Sabreliner, now sliding on top of a film of water, slipped off the left side of the runway and continued moving parallel to it for 800 feet, finally coming to a stop after rolling up onto an adjoining taxiway. The crew, having had quite enough surfing for one day, stop-cocked the right engine, turned off the battery and departed the airplane.

The technique of shuting down an engine immediately after landing (when, as in this case, the aircraft was already hydroplaning) probably induced enough yaw to degrade positive control. There are many variables in a wet runway condition, including depth and location of standing water, plus wind direction and velocity, so a measure of extra caution is needed to keep from hanging ten right off the tarmac.

AFTER DEADLINES

FIRSTS IN TOTAL FORCE training occurred recently when C-130s equipped with Adverse Weather Aerial Delivery Systems (AWADS) from the 317th Tactical Airlift Wing at Pope AFB, North Carolina, went to Richards-Gebaur AFB, Missouri, to participate with the 442d Tactical Airlift Wing (AFRES) in joint airdrop training. It was also the first time that AFRES aircraft equipped with Station Keeping Equipment (SKE) had flown formation with AWADS aircraft.

C-141 STRETCH PROGRAM continues ahead of schedule. The floor of the huge 74-acre assembly building at the Lockheed-Georgia plant is lined with Starlifters in various stages of the modification process which will add 30 percent more cargo capacity plus in-flight refueling capability. Eighty stretched C-141s are scheduled for delivery in 1980 with the remainder of the B-model fleet due out by mid-1982.

C-5 WING MOD MOVES A STEP CLOSER with the contract recently awarded to Lockheed to procure the long-lead-time material that will be necessary in the wing modification. The new wing structure will extend the service life of the C-5 by 30,000 flight hours.

MAY 20, 1980 MARKS THE 53rd ANNIVERSARY of Charles Lindbergh's solo flight accross the Atlantic. On that day in 1927, "The Spirit of St Louis," heavily laden with fuel, struggled to become airborne from Roosevelt Field in New York on a flight destined to become one of the most celebrated events in the history of manned flight.

A STRAKE IN TIME SAVES NINE. The seven-foot-long fins called "after body strakes" are pictured installed on a C-130 test aircraft. The strakes smooth out the airflow at the rear of the aircraft during cruise, decrease drag and increase fuel economy by about three percent. Currently undergoing tests by Lockheed engineers, they could save approximately nine-million dollars a year in fuel costs, once installed on the C-130 fleet.

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